

New forest owners and owners-to-be: apples and oranges?

Heimo Karppinen

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Abstract This literature review focuses on two groups of landowners in the US and Finland: those current family owners who have recently become forest owners, with a relatively short duration of ownership, and private individuals who can be expected to become forest owners in the future are compared. The former group is called “new owners,” and the latter “future owners,” respectively. This study aims to find what can be concluded about future owners from studies of new owners based on the assumption that new owners are interpreted to represent future owners in these studies. The data consists of eight studies conducted after the mid 90s.

The literature analysis reveals that studies on current owners with short-term experience as forest owners might suggest some developments in ownership structure and service needs, and potentially confirm some forecast trends. Examples of these generation-bound findings, which can probably be generalized across future owners, are new owners’ higher level of education and higher likelihood of living in urban areas. Findings concerning certain behavioral patterns or structural features should be regarded cautiously. Former studies suggest that new owners are quite active harvesters. New forest owners are younger, and younger owners seem to cut more than older owners. However, conclusions concerning future owners’ timber supply behavior are certainly different if they are based on the assumption of an age cohort effect as opposed to a life-cycle effect. Qualitative studies on future owners cannot reveal future owner and holding characteristics or behavioral patterns, but they can give insight on the often generation-bound values and objectives of forest ownership.

Keywords Demographics · Family forest owners · Future forest owners · Meta-analysis · Small-scale forest owners

H. Karppinen (✉)
Department of Forest Sciences, University of Helsinki, P.O. Box 27, 00014 Helsinki, Finland
e-mail: heimo.karppinen@helsinki.fi

Introduction

The idea of studying new family forest owners and their forestry behaviors is in itself not a new one. In many countries, for instance in Finland, a structural change in non-industrial private forest ownership has been an impetus for many survey studies on forest owners since the late 1960s (see Karppinen and Hänninen 2006). The new owners, non-farmers, were regarded as a threat to roundwood production and timber supply. However, this assumption was not supported by the study results (e.g. Kuuluvainen 1989).

Studies categorizing current family forest owners by owner demographics and holding characteristics, attitude or objective typologies are numerous. Examples of European studies are Kuuluvainen et al. (1996), Karppinen (1998), Kvarda (2004), Hogl et al. (2005), Wiersum et al. (2005), Ní Dhubháin et al. (2007) and Favada et al. (2009). The American literature is extensive, e.g. Butler and Leatherberry (2004) and Butler (2008) as well as reviews by Alig et al. (1990), Amacher et al. (2003), Hodgdon and Tyrell (2003) and Beach et al. (2005). In these studies new forest owners are defined explicitly or implicitly. New or future owners have also been investigated indirectly by making forecasts on the development of the demographic characteristics of forest owners (Reunala 1974; Plantinga and Buongiorno 1990; Ripatti 2000; Karppinen and Ahlberg 2008).

Recently, new owners have been studied by describing the differences between new and “established” forest owners based on the length of land tenure, the holding being either purchased or inherited (Newman et al. 1996; Donnay et al. 2005; Kendra and Hull 2005; Hänninen and Ripatti 2007; Rämö and Toivonen 2009). Future owners have also been investigated directly by interviewing potential heirs or students (Mater 2005; Mäkijärvi 2009; Karppinen and Tiainen 2010).

Meta-analyses are conducted to show gaps in the literature and to suggest new research avenues (Wolf 1986). This literature review focuses on two groups of landowners in the US and Finland: those current family owners who have recently become forest owners, with a relatively short duration of ownership, and private individuals who can be expected to become forest owners in the future are compared. The former group is called “new owners,” and the latter “future owners,” respectively. However, studies with ambiguous descriptions of “newness” based on forest owners’ characteristics, attitudes, objectives or behaviors were excluded from the present analysis. In addition, those different kind of new owners who have acquired their forest land in the restitution process in former socialist countries or by field afforestation were also excluded.

We assume that new owners are interpreted to represent future owners in these studies concerning new owners. This study aims to find what can be concluded about future owners from studies of new owners. The following section describes the data used, and after that various definitions of new and future forest owners are examined, and the results of the studies are described and compared. Finally, based on this synthesis of the previous literature, the results are evaluated, and motivations for future research are outlined.

Data and meta-analysis

The research data consists of eight studies conducted after the mid 90s, seven of them after 2005. Table 1 summarizes some basic features of the studies, such as the criterion of being a new/future forest owner, the study region, the data collection method and the number of observations. Four studies were found concerning the US, and four examined Finland. To our knowledge, the topic has not been studied elsewhere.

These studies were based on mail inquiries, personal thematic interviews, focus group interviews and telephone interviews. Three kinds of criteria were used to classify the forest owner as a new or future owner: having short land tenure, being a descendant of a current owner or being a student (age cohort). The last criterion may only be relevant in countries where private forest ownership is very common. The size of the holding was also considered in the studies. Studies based on quantitative data on new owners were compared using simple vote counting (see Glass et al. 1987; Beach et al. 2005). Studies concerning future owners were discussed

Table 1 Studies of new and future forest owners

Study	Criterion	Region	Data collection method	Usable sample size/response rate
Newman et al. (1996)	Purchase of forestland of over 30 ha (75 acres) during 1 year, maximum tenure 1.5 years	Georgia/US	Mail inquiry	475/41%
Donnay et al. (2005)	Purchase of forestland of over 4 ha (10 acres) during 2 years, maximum tenure 3 years	Minnesota/US	Mail inquiry	288/74%
Kendra and Hull (2005)	Purchase of forestland of between 0.8 and 20 ha during 5 years, maximum tenure 5 years	Virginia/US	Mail inquiry	661/44%
Mater (2005)	Children of current private forest landowners, parents' forestland over 4 ha (10 acres)	6 regions in 25 states/US	Telephone interview	300 future owners
Hänninen and Ripatti (2007)	Forestland of over 5 ha, maximum tenure 5 years	Finland	Mail inquiry	1999 data: 4821/55% 2003 data: 880/47%
Karppinen and Tiainen (2010)	Descendants of the post-war baby boom generation (born in 1945–1950), parents' forestland over 5 ha	Southern Finland	Thematic interview	22 future owners
Mäkijärvi (2009)	Students of age 16–25 years	Southern Finland	Focus group interview	22 students
Rämö and Toivonen (2009)	Forest management fee (over 4 ha), maximum tenure 9 years	Finland	Focus group interview Mail inquiry	19 forest owners 80/61%

separately. Thus, this meta-analysis is partly quantitative and partly narrative, but no attempt is made to assess the quality of the studies included in the analysis (see Glass et al. 1987).

Results

Definitions

A new owner was defined in the studies by setting an upper limit on the length of forest land tenure (Table 1). In the US, land is mostly acquired by purchase in the free market; some 80% of forest owners have purchased at least part of their forest land (Butler 2008). On the contrary, in Finland, 85% of forest land is either acquired by inheritance or is purchased from relatives or both (Peltola 2009). The maximum length of tenure of a new owner ranged from 1.5 years (Newman et al. 1996) up to 9 years (Rämö and Toivonen 2009). The latter limit provides a broad definition, taking into account that the total duration of ownership of a Finnish owner is estimated to be, on average, 30 years (Ripatti 1996). Donnay et al. (2005) used a 3 year maximum, while Kendra and Hull (2005) and Hänninen and Ripatti (2007) applied a 5 year limit.

The size of purchased or inherited forestland was also used as a selection criterion when defining a new or a future owner. The minimum size varied from 0.8 hectares (Kendra and Hull 2005) to 30 hectares (75 acres) (Newman et al. 1996). Donnay et al. (2005) and Mater (2005) applied a four-hectare (10 acres) lower limit, and Hänninen and Ripatti (2007) as well as Karppinen and Tiainen (2010) a five-hectare lower limit. Rämö and Toivonen (2009) included in their data only those holdings paying obligatory forest management fees, which corresponds to a lower limit of four hectares in southern Finland. Unlike other studies, Kendra and Hull (2005) also set an upper limit on holding size (20 ha).

In the Finnish studies, setting a lower limit of 4–5 hectares was justified by the potential importance of roundwood production. However, there are 127,000 forest holdings sized between two and four hectares in Finland (Peltola 2009). Newman et al. (1996) explained the inclusion of only larger holdings (>30 ha) in a similar manner. Also, Donnay et al. (2005) considered smaller parcels (<4 ha) to be mainly used for residence purposes.

Mater (2005), Karppinen and Tiainen (2010) and Mäkijärvi (2009) studied future forest owners. Mater (2005) defined future owners as the children of current forest owners, and in Karppinen and Tiainen (2010), future forest owners were defined as the descendants of the post-war baby boom generation. This generation, comprised of members born between 1945 and 1950, owns one-fifth of the non-industrial private forests in Finland. Mäkijärvi (2009) studied students between 16 and 25 years of age in three differently oriented high schools (fine arts, natural sciences, economics) and in a natural resources college. More than half of the interviewees lived in a family, grandparents included, that owned a parcel of forest.

New owners

New owners were defined by short land tenure. The comparable results of new owner studies are summarized in Table 2. The column on the right shows the relative frequency of the reported feature in question compared to the total number of analyzed studies. Percentage proportions are used despite the very small number of observations.

New forest owners seemed to be younger (60% of the studies) and better educated (80% of the studies) than those owners with a longer land tenure. In general, they did not live on their holdings, as shown by the dominance of absentee owners among new owners (80% of the studies). New owners could be regarded quite often as non-farmers (60%) and urban dwellers (40%). The assumption that

Table 2 Characteristics, ownership objectives and behavior of new forest owners

	Newman et al. (1996)	Donnay et al. (2005)	Kendra and Hull (2005)	Hänninen and Ripatti (2007)	Rämö and Toivonen (2009)	Share of studies, %
Demographics						
Younger	x			x	x	60
Older						0
Better educated	x		x	x	x	80
Less educated						0
Farmer						0
Non-farmer	x			x	x	60
Retired						0
Urban				x	x	40
Rural	x					20
Resident			x			20
Absentee	x	x		x	x	80
Acreage larger		x				20
Acreage smaller						0
More affluent	x		x			40
Less affluent						0
Objectives						
Multiple	x		x	x	x	80
Economic	x	x	x	x	x	100
Amenity	x	x	x	x	x	100
Behavior						
Active timber harvesting	x			x		40
Active forest management						0

new owners would be more affluent than other owners did not receive strong support from the comparison (40% of the studies). New owners possessed larger tracts than others only in one study (20%).

The studies confirm that new forest owners can be considered a heterogeneous group concerning their objectives of forest ownership. All the studies note that there were forest owners with economic objectives and those underlining the amenity values of their forests. Four studies (80%) also suggest that multifunctional forestry was important for some new owners. New owners appeared to harvest timber quite actively (40% of the studies), but the evidence concerning activity in other forest management was non-existent.

Future owners in the US

Mater (2005) studied the children of current forest owners in 25 different states by conducting telephone interviews. A large intergenerational ownership change of family forest land will be taking place in the US in the next two decades. These private forests also contribute significantly to the provision of common goods such as water quality and wildlife, emphasizing the need to understand the management goals and interests of the future owners.

Most of the next generation owners had so far had little involvement with their parents' forests and actually did not have any intention of becoming more involved. A large share of the future owners were rather well-paid professionals in fields other than forestry. Most future owners lived further away from their family forests and did not have any plans to move closer to the forests, but they still wanted to inherit the land in the future. However, many of the children of forest owners did not want to become involved in the present management of the forests, which may lead to changes in applied forestry in the future. Women emphasized land as a family legacy, whereas men focused more on income and personal use of the forest. Although future owners in general felt that forest land should remain forest land, they did not exclude, in case of financial emergency, the possibility of land conversion, division and sale. Therefore, further fragmentation or conversion of forest land may accelerate in the future, which points out the need to revise the existing landowners' assistance programs.

Future owners in Finland

Karppinen and Tiainen (2010) studied future forest owners by interviewing the descendants of the post-war baby boom generation. This age cohort, born between 1945 and 1950, owns one-fifth of the private forests. In 15–20 years, these owners, who lived on their estates during their childhood and adolescence, will give up their forest ownerships in favor of the younger, more urban generation, mainly via the inheritance system. This may cause major changes in the values, objectives and behaviors of forest owners.

The study examined future forest owners' values, ownership objectives, forestry knowledge, their interest in forestry as well as their needs for forestry extension and labor services. The study results suggest that future owners can be described using a typology based on landowner objectives, which is similar to the one presented in

earlier literature concerning current owners: multiobjective owners, recreationists, self-employed owners, investors and indifferent owners (Favada et al. 2009; see also Ní Dhubbáin et al. 2007). Future owners were labeled hobby owners, recreationists, active owners, practical owners and indifferent owners, respectively. Future owners seemed to have many kinds of economic or amenity objectives, or they intend to practice multifunctional forestry.

The study also analyzed, for the first time in forest owner literature, future forest owners' general values applying Schwartz's value theory (Schwartz and Bilsky 1990; Schwartz 1992). The Short Schwartz's Value Survey, SSVS, which directly measures motivational types instead of using several value indicators, was applied in measuring values (Lindeman and Verkasalo 2005). Ten universal motivational or value types can be distinguished (Schwartz 1992; Puohiniemi 1995): self-direction, stimulation, hedonism, achievement, power, security, conformity, tradition, benevolence and universalism.

Although the sample was very small, the results suggest that future forest owners differ from the population at large concerning their values. Future owners ranked universalism, which includes such values as the beauty of nature and art and nature conservation, much lower than the whole population. In fact, this was the only difference in rankings. The finding is in line with Karppinen and Hänninen's (2000) notion that forest owners are, in general, more in favor of forest utilization than of forest conservation, but contradicts American studies suggesting only minor differences in the attitudes of forest owners and the public at large (Bliss et al. 1994, 1997; Bourke and Luloff 1994).

The future owner typology is summarized in Table 3. Although it seems that the objectives of future forest owners would be rather similar to those of current owners, for instance, bio-energy production or carbon sequestration may be given more attention in the future. On the other hand, major changes may occur in the relative importance of the objectives. The importance of non-timber objectives and the relative share of recreationists is very likely to increase. The number of indifferent owners can also be expected to rise in the future. If these future owner groups' cutting behavior resembles that of the equivalent groups among current owners (Favada et al. 2009), the changes would diminish the roundwood supply from private forests. The decreasing use of family labor forces in silvicultural activities may lead to a greater demand for labor services.

Finnish students

According to Mäkijärvi (2009), those students who expected (or would like) to inherit forest in the future could be divided into four groups. *Global philosophers* felt that they were a part of the global ecosystem. They wanted to save their share of the globe by not doing anything in their forests. *Hobby owners* wanted to be occupied with their forest by doing forest management activities. They saw forest work as good physical exercise, but also expressed concern about the global environment. *Outmovers* planned to leave the farm after school. They would like to participate in forest work and also expected to profit from their forest. Outmovers appreciated being in a chain of generations with forest ownership, and they took a

Table 3 Typology of future forest owners. Source: Karppinen and Tiainen 2010

	Hobby owners	Recreationists	Active owners	Practical owners	Indifferent owners
Demographics					
Residence			Close to the forest		Far away from the forest
Gender			Male		
Acreage		Smallish			
Interest in forestry					
Level of knowledge	Average	Average	Good	Average	Very small
Self-activity	Average	Low	High	Low	Low
Attitudes					
Forest conservation	Current area sufficient	Favorable	Favorable	Neutral	
Clear cuttings	Permissive with conditions	Unfavorable	Unfavorable	Permissive	
Values					
	Hedonism and tradition important	Hedonism emphasized	Self-direction emphasized	Small differences in value preferences	Value conflict between universalism and power

global view for granted. They regarded family members who had continued farming as sources of forestry information and were not familiar with extension organizations. *Residents* planned to stay on the farm and continue farming. They considered forestry a source of livelihood and employment. Residents felt that they were “almost sufficiently” aware of forestry issues and were willing to contact a forestry professional if needed.

Another division made by Mäkijärvi (2009) was based on the current economic importance of the forests and forestry practices in the family. If students were used to forest management activities and timber sales in their family forests during adolescence, they would probably continue the economic utilization of forests in the future in a similar manner. Those who lived far away from their family forests might not be aware of the utilization of forests and hence might disapprove of timber sales. In general, students highly appreciated the forestry experiences shared by their parents or grandparents. However, their parents were often not communicative concerning timber sales and sales incomes.

Discussion

Future owners were defined as descendants of current owners or as high school students who may inherit forest in the future. New owners were defined by setting a time limit on forest land tenure. This criterion can be applied regardless of the land

acquisition pattern, whether purchase or inheritance. The maximum length of tenure ranged from 1.5 years up to 9 years. Perhaps, a valid measure of “newness” could be five years at the maximum. In forestry with its long rotation periods, five years is not a long time, although probably long enough for an owner to “settle down.”

It is difficult to set a minimum holding size when studying new forest owners. The lower limit is dependent on the holding size structure in the region and the type of forestry behavior considered. If roundwood production is the main concern, larger holdings are more interesting than smaller ones. On the other hand, if multifunctional forestry is analyzed, small parcels also count.

Studies directly addressing future owners are more difficult to conduct in countries such as the US where most forest owners have purchased some or all of their forest land (Butler 2008). A potential heir is possible to identify (Mater 2005), but who is a potential land purchaser in the future? In Finland, the situation is the opposite: only 15% of holdings were purchased in the free market (Peltola 2009). However, representative surveys on future owners are not easy to execute in Finland due to a lack of sampling information. For instance in their qualitative study, Karppinen and Tiainen (2010) first contacted current owners to obtain the contact information of their children. Mater (2005) used the same procedure in the US, which resulted in 300 telephone interviews in 25 different states. In countries where private forest ownership is common and holdings are mostly inherited, it would be possible to study a certain age cohort of the total population via mail inquiry. Of course, the cost efficiency of this type of sampling could be called into question.

Meta-analyses are meant to condense and synthesize the existing information on a certain research area in order to point out deficiencies which would motivate further research (Wolf 1986). Studies on current owners with short-term experience as forest owners might suggest some developments in ownership structure and service needs, and potentially confirm some forecast trends. Two examples of these findings, which could probably be generalized across future owners, are new owners' higher level of education and higher likelihood of having an urban residence.

However, findings concerning some behavioral patterns or structural features should be regarded cautiously. New and future owners are “apples and oranges.” For instance, it is evident that in countries where an inheritance system is dominant, new owners are younger. What can be said about the age of future owners if forecasts still refer to the aging of forest owners, as is the case in Finland (Karppinen and Ahlberg 2008)? The review also revealed that new owners are quite active harvesters. New forest owners are younger, and younger owners seem to cut more than older owners (Kuuluvainen et al. 1996; Kuuluvainen and Tahvonen 1999; cf. Favada et al. 2009). In addition, there are two kinds of interpretations for this difference in cuttings: a life-cycle effect and a generational (age cohort) effect, or a mix of both. The former simply implies that the financial needs of forest owners vary across time: younger owners need money for consumption and investments, but older owners may highlight bequest motives. Interpretation of the cohort effect assumes that forest owners adopt certain consumption patterns in their youth which are stable throughout their lives. Conclusions concerning future owners' timber supply behavior are certainly different if they are based on the assumption of a cohort effect as opposed to a life-cycle effect.

Qualitative studies on future owners cannot reliably reveal owner and holding characteristics or behavioral patterns. However, they can give insight on the values and objectives of forest ownership, which are often generation-bound and rather stable (Inglehart 1977; Karppinen 2000). Future owners' knowledge of and interest in forestry as well as forecasts of their needs for forestry extension and labor services are also important from the point of view of forest policy.

Few studies have been conducted and little is known about new forest owners and future owners. However, new owners can be studied when surveying current owners, if the main criterion is the length of land tenure. The research of future forest owners is more complicated. Therefore, very few studies have been conducted concerning explicitly future owners. They have to be studied separately apart from current owners, but representative surveys are difficult or even impossible to execute. Qualitative studies have their own limitations; they cannot give reliable estimates of the demographics and behaviors of the future owners.

Glass et al. (1987) list four criticisms of meta-analysis. First, there is the problem of integrating different studies that use, for instance, different measuring techniques and that even concern different countries. Second, meta-analysis can also use data from studies of poor quality. Third, there may be a selection bias in the reported research. There may be systematic differences in the results shown in journals versus books versus unpublished papers. And fourth, the existence of non-independent data means that multiple results are derived from the same study in various publications versus a study as a unit of analysis. It seems that this review cannot avoid the first two pitfalls. It concerns various data collection methods and two different countries, and the quality of the studies was not assessed. However, this review is better able to handle the latter criticisms, selection bias and "lumpy" data.

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References

- Alig RJ, Lee KJ, Moulton RJ (1990) Likelihood of Timber management on nonindustrial private forests: evidence from research studies. USDA forest service, Southeastern Forest experiment station, General Technical Report SE-60
- Amacher GS, Conway MC, Sullivan J (2003) Econometric analyses of nonindustrial forest landowners: is there anything left to study? *J For Econ* 9(2):137–164
- Beach RH, Pattanayak SK, Yang J-C, Murray BC, Abt RC (2005) Econometric studies of non-industrial private forest management: a review and synthesis. *For Pol Econ* 7(3):261–281
- Bliss JC, Nepal SK, Brooks RT Jr, Larsen MD (1994) Forestry community or granfalloon? Do forest owners share the public's views? *J For* 92(9):6–10
- Bliss JC, Nepal SK, Brooks RT Jr, Larsen MD (1997) In the mainstream: environmental attitudes of mid-south forest owners. *South J Appl For* 21(1):37–43
- Bourke L, Luloff AE (1994) Attitudes toward the management of nonindustrial private forest land. *Soc Nat Res* 7(5):445–457
- Butler BJ (2008) Family forest owners of the United States, 2006. USDA Forest Service, Northern research station. General technical report NRS-27
- Butler BJ, Leatherberry EC (2004) America's family forest owners. *J For* 102(7):4–9

- Donnay JS, Kilgore MA, Snyder SA (2005) A look at past and present forest landowner preferences and intentions in northern Minnesota. University of Minnesota, Department of Forest Resources, Staff paper series 184
- Favada IM, Karppinen H, Kuuluvainen J, Mikkola J, Stavness C (2009) The effects of timber prices, ownership objectives, and owner characteristics on timber supply. *For Sci* 55(6):512–523
- Glass GV, McGaw B, Smith ML (1987) Meta-analysis in social research. 4th printing. Sage publications, London
- Hänninen H, Ripatti P (2007) Uudet metsänomistajat. [New forest owners] TTS tutkimuksen tiedote, Luonnonvara-ala: metsä 707
- Hodgdon B, Tyrell M (2003) Literature review: an annotated bibliography on family forest owners. Program on private forests, Yale University, School of Forestry and Environmental Studies, Global Institute of Sustainable Forestry Research paper 002
- Hogl K, Pregernig M, Weiss G (2005) What is new about new forest owners? A typology of private forest ownership in Austria. *Small-scale For Econ Manag Pol* 4(3):325–342
- Inglehart R (1977) The silent revolution: changing values and political styles among western publics. Princeton University Press, Princeton, New Jersey
- Karppinen H (1998) Values and objectives of non-industrial private forest owners in Finland. *Silva Fenn* 32(1):43–59
- Karppinen H (2000) Forest values and the objectives of forest ownership (doctoral dissertation). Metsäntutkimuslaitoksen tiedonantoja 757
- Karppinen H, Ahlberg M (2008) Metsänomistajakunnan rakenne 2020: yleiseen väestömuutokseen perustuvat ennustemallit. [Forest owners in 2020: Predicting the structural characteristics of Finnish private forest owners by population forecasts]. *Metsätieteen aikakauskirja* 1(2008):17–32
- Karppinen H, Hänninen H (2000) Forest conservation and economic utilization: public attitudes in Finland. *J For Econ* 6(1):55–79
- Karppinen H, Hänninen H (2006) Monitoring finnish family forestry. *The For Chron* 82(5):657–661
- Karppinen H, Tiainen L (2010) “Semmonen niinkun metsäkansa”-suurten ikäluokkien perijät tulevaisuuden metsänomistajina. [“Sort of forest people”-future forest owners: descendants of the post war baby boom generation] *Metsätieteen aikakauskirja* 1(2010):19–38
- Kendra A, Hull RB (2005) Motivations and behaviors of new forest owners in Virginia. *For Sci* 51(2):142–154
- Kuuluvainen J (1989) Nonindustrial private timber supply and credit rationing. Microeconomic foundations with empirical evidence from the Finnish case. Swedish University of Agricultural Sciences, Department of Forest Economics, Report 85
- Kuuluvainen J, Tahvonen O (1999) Testing the forest rotation model: evidence from panel data. *For Sci* 45(4):539–551
- Kuuluvainen J, Karppinen H, Ovaskainen V (1996) Landowner objectives and nonindustrial private timber supply. *For Sci* 42(3):300–309
- Kvarda E (2004) Non-agricultural forest owners’ in Austria—a new type of forest ownership. *For Pol Econ* 6:459–467
- Lindeman M, Verkasalo M (2005) Measuring values with the short Schwartz’s value survey. *J Person Assess* 85(2):170–178
- Mäkijärvi L (2009) Nuorten suhtautuminen metsiin ja metsien käyttöön tulevaisuuden metsänomistajina ja päätöksentekijöinä. [Attitudes to forests and forest related issues among Finnish youth as future forest owners and decision-makers] Pellervon taloudellisen tutkimuslaitoksen työpapereita 117
- Mater C (2005) The new generation of private forest landowners: brace for change. *The Pinchot Letter* 10(2):1–4
- Newman DH, Aronow ME, Harris Jr. TG, Macheski G (1996) Changes in timberland ownership characteristics in Georgia. In: Baughman MJ, Goodman N, Thayer D (eds) Proceedings of symposium on nonindustrial private forests: learning from the past, prospects for the future, 18–20 February, 1996, Washington DC. Extension special programs, Minnesota extension service, University of Minnesota, pp 214–221
- Ní Dhubháin A, Cobanova R, Karppinen H, Mizaraitė D, Ritter E, Slee B, Wall S (2007) The values and objectives of private forest owners and their influence on forestry behaviour: The implications for entrepreneurship. *Small-Scale For* 6(4):347–357
- Peltola A (ed) (2009) Finnish statistical yearbook of forestry (2009). Official statistics of Finland, Agriculture, forestry and fishery 2009

- Plantinga AJ, Buongiorno J (1990) Determinants of changes in non-industrial private timberland ownership in the United States. *J World For Res Manag* 5:29–46
- Puohiniemi M (1995) Values, consumer attitudes and behaviour—An application of Schwartz's value theory to the analysis of consumer behaviour and attitudes in two national samples. *Helsingin yliopiston sosiaalipsykologian laitoksen tutkimuksia* 3/1995
- Rämö A-K, Toivonen R (2009) Uusien metsänomistajien asenteet, motiivit ja aikomukset metsiin ja metsänomistukseen liittyvissä asioissa. [Forest related attitudes, motives and intentions among new private forest owners in Finland] Pellervon taloudellisen tutkimuslaitoksen raportteja 216
- Reunala A (1974) Structural change of private forest ownership in Finland. *Commun Inst For Fenn* 82(2):1
- Ripatti P (1996) Factors affecting partitioning of private forest holdings in Finland. A logit analysis. *Acta For Fenn* 252
- Ripatti P (2000) Use of log-linear models in forecasting structural changes in Finnish non-industrial private forest ownership. *Silva Fenn* 34(3):275–283
- Schwartz SH (1992) Universals in the content and structure of values: theoretical advances and empirical tests in 20 countries. In: Zanna MP (ed) *Advances in experimental social psychology*, vol 25. Academic Press, San Diego, pp 1–65
- Schwartz SH, Bilsky W (1990) Toward a theory of the universal content and structure of values: extensions and cross-cultural replications. *J Person Soc Psychol* 58(5):878–891
- Wiersum KF, Elands BHM, Hoogstra MA (2005) Small-scale forest ownership across europe: characteristics and future potential. *Small-scale For Econ Manag Pol* 4(1):1–19
- Wolf FM (1986) *Meta-analysis: quantitative methods for research syntesis*. Series: quantitative applications in the social sciences. Sage university paper 59